

Final



Former McClellan Air Force Base

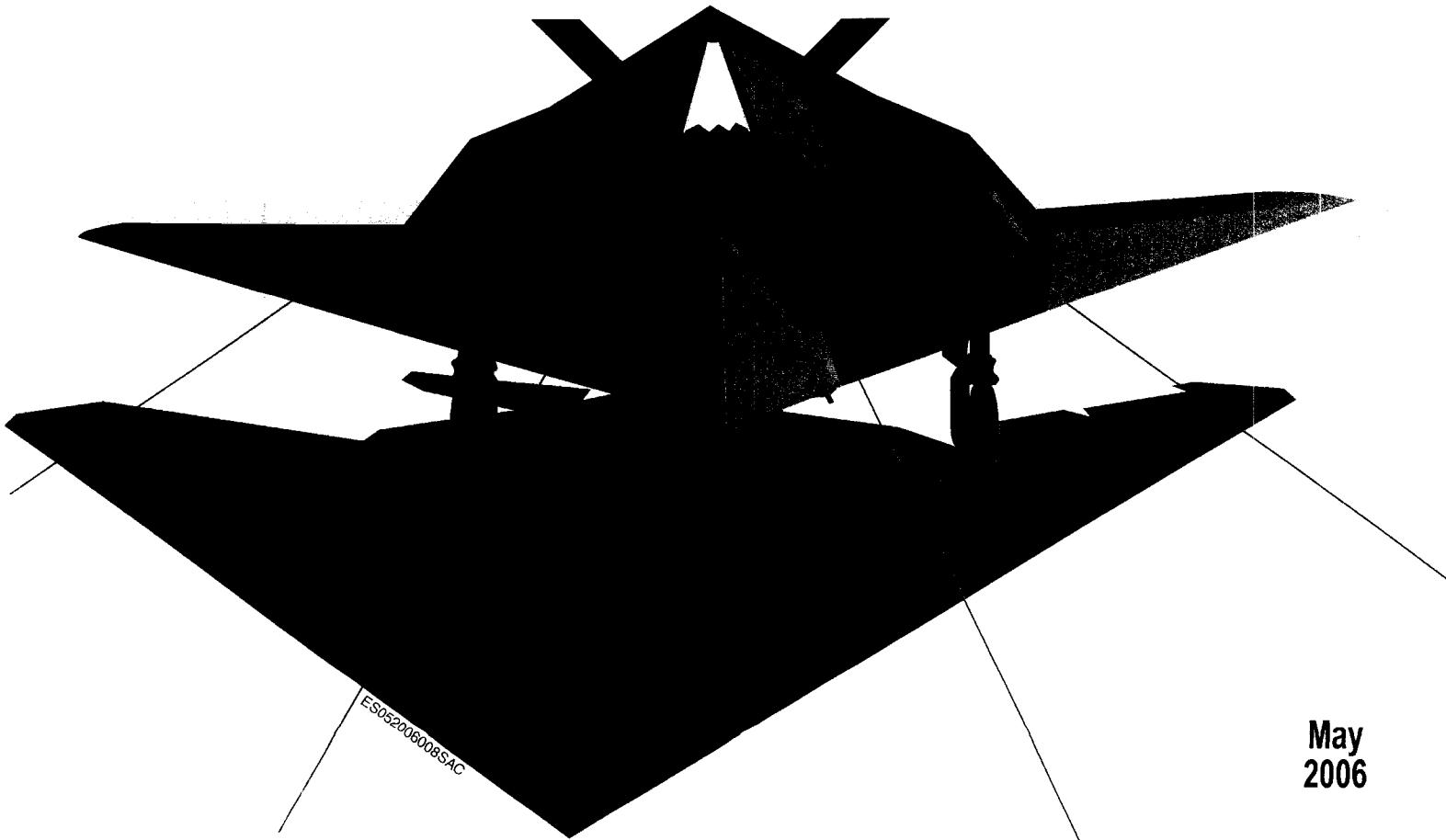
Focused Strategic Sites Feasibility Study

Volume 1 of 2

Project No.: PRJY 2005-7222D

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Task Order: 0244





DEPARTMENT OF THE AIR FORCE
AIR FORCE REAL PROPERTY AGENCY

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FACILITIES PROGRAM

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MEMORANDUM FOR SEE DISTRIBUTION

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FROM: AFRPA Western Region Execution Center
3411 Olson Street
McClellan CA 95652-1003

SUBJECT: Submission of the Focused Strategic Sites Feasibility Study (FS), Final Copy
DSR #1440-5

1. Attached is the Final version of the Focused Strategic Sites FS (DSR# 1440-5). This is categorized as a primary document, with a due date of 24 May 2006. Unless comments are received, this document will be considered final as of 1 June 2006. Comments received on the Draft Final document have been incorporated in the Final version. The response to comments table is located in Appendix E.
2. The following are significant updates/changes made to the FS in response to comments received:
 - Additional radiological contaminants of potential concern (COPCs) have been identified for the disposal pits.
3. Any questions regarding this document should be directed to Mr. Steve Mayer, FSS FS project manager, AFRPA Western Region Execution Center, (916) 643-0830 ext 224.

STEVEN K. MAYER P.E.
BRAC Environmental Coordinator

Attachment:
Focused Strategic Sites FS, Final Copy

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Executive Summary

Introduction

This Focused Strategic Sites Feasibility Study (FS) has been prepared to support a Record of Decision (ROD) for 11 sites located at the former McClellan Air Force Base (AFB) in Sacramento, California (Figure ES-1). The 11 Installation Restoration Program (IRP) sites addressed in this FS are considered to be high volume, Strategic Sites because these sites represent the largest volumes of waste to be addressed at McClellan. The 11 Strategic Sites included in this FS are shown on Figure ES-2 and are evaluated for volatile organic compounds (VOCs) in shallow soil gas (SSG) and soil, and non-VOCs and radionuclides in soil. The 11 Strategic Sites are listed as follows with the Operable Unit (OU) and Investigation Cluster (IC) (where applicable) that each site is located within:

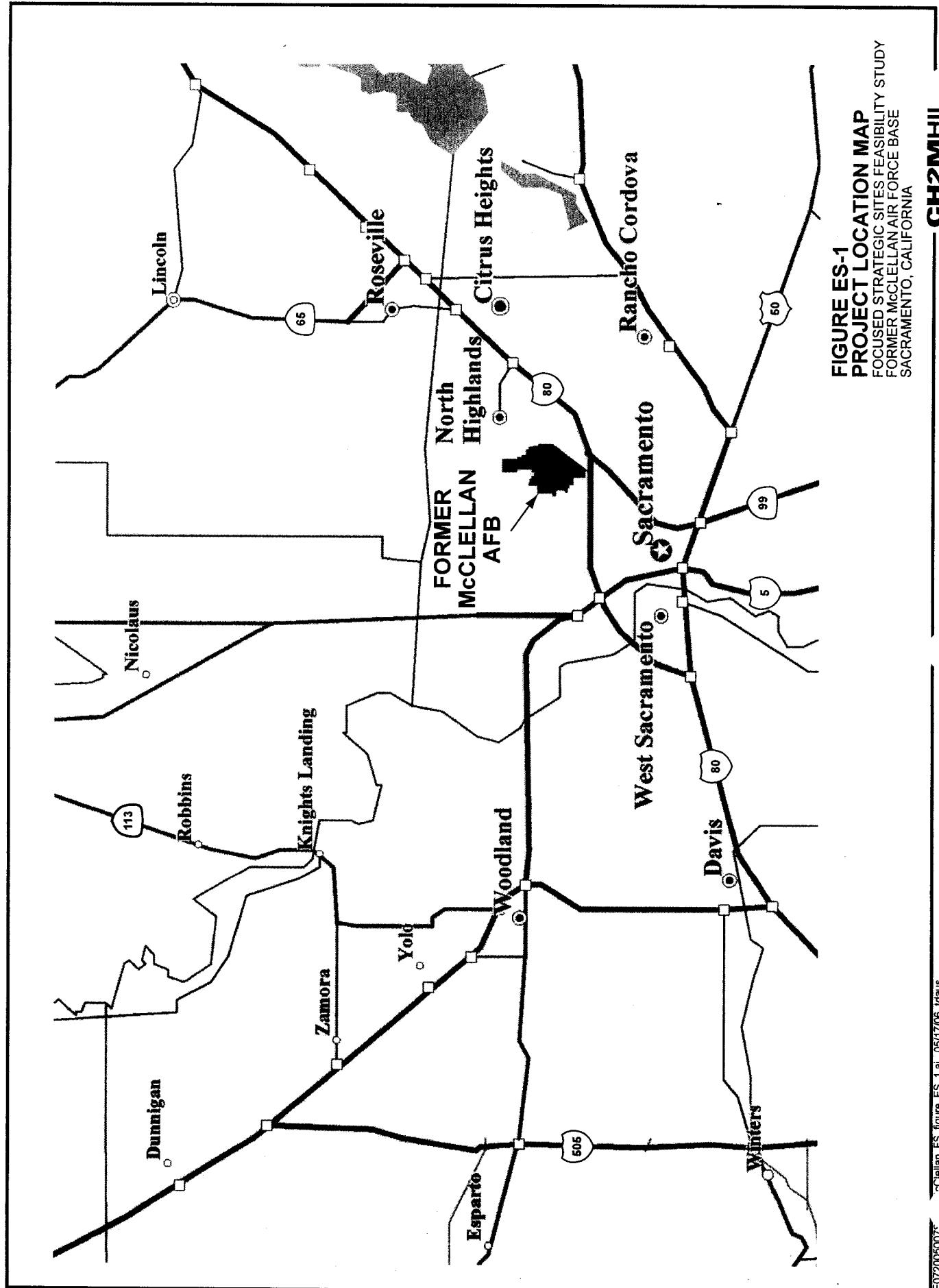
- Area of Concern (AOC) 313 (Fire Training Area [FTA]) (OU C; IC 19)
- Confirmed Site (CS) 010 (OU C; IC 19)
- CS 011 (OU C; IC 19)
- CS 012 (OU C; IC 19)
- CS 013 (OU C; IC 19)
- CS 014 (OU C; IC 19)
- CS 022 (OU C1; IC 13)
- CS 024 (OU A; IC 42)
- Potential Release Location (PRL) 008 (OU C; IC 21)
- Small Arms Firing Range (SAFR) (OU C/D; IC 21)
- Vadose Zone (VZ) (OU D)

This FS addresses VOCs (including chlorinated solvents and petroleum-related compounds) in soil and soil gas. Semi-volatile organic compounds (SVOCs) and non-VOCs such as metals and radionuclides in soil are also addressed. Pathways evaluated in this FS consist of:

- Impacts on human health via direct contact with soil and inhalation of indoor air
- Impacts to ecological health via direct contact
- Impacts to surface water from non-VOCs and radionuclides
- Impacts to groundwater from VOCs, non-VOCs, and radionuclides

Impacts to groundwater from VOCs at these 11 sites are currently being addressed as part of the ongoing SVE program. As remediation of VOCs nears completion at these sites, STOP analyses will be performed and provided as Primary Documents under the Interagency Agreement for regulatory agency review.

This FS identifies and evaluates remedial technologies and alternatives to mitigate contaminants in soil and shallow soil gas resulting from past hazardous materials handling and hazardous waste disposal practices at McClellan. This FS also provides information to support risk management decisions and the future selection of the most appropriate remedy for each site. The final selection and documentation of the remedies will be presented in the Record of Decision (ROD), currently scheduled for completion in 2006.



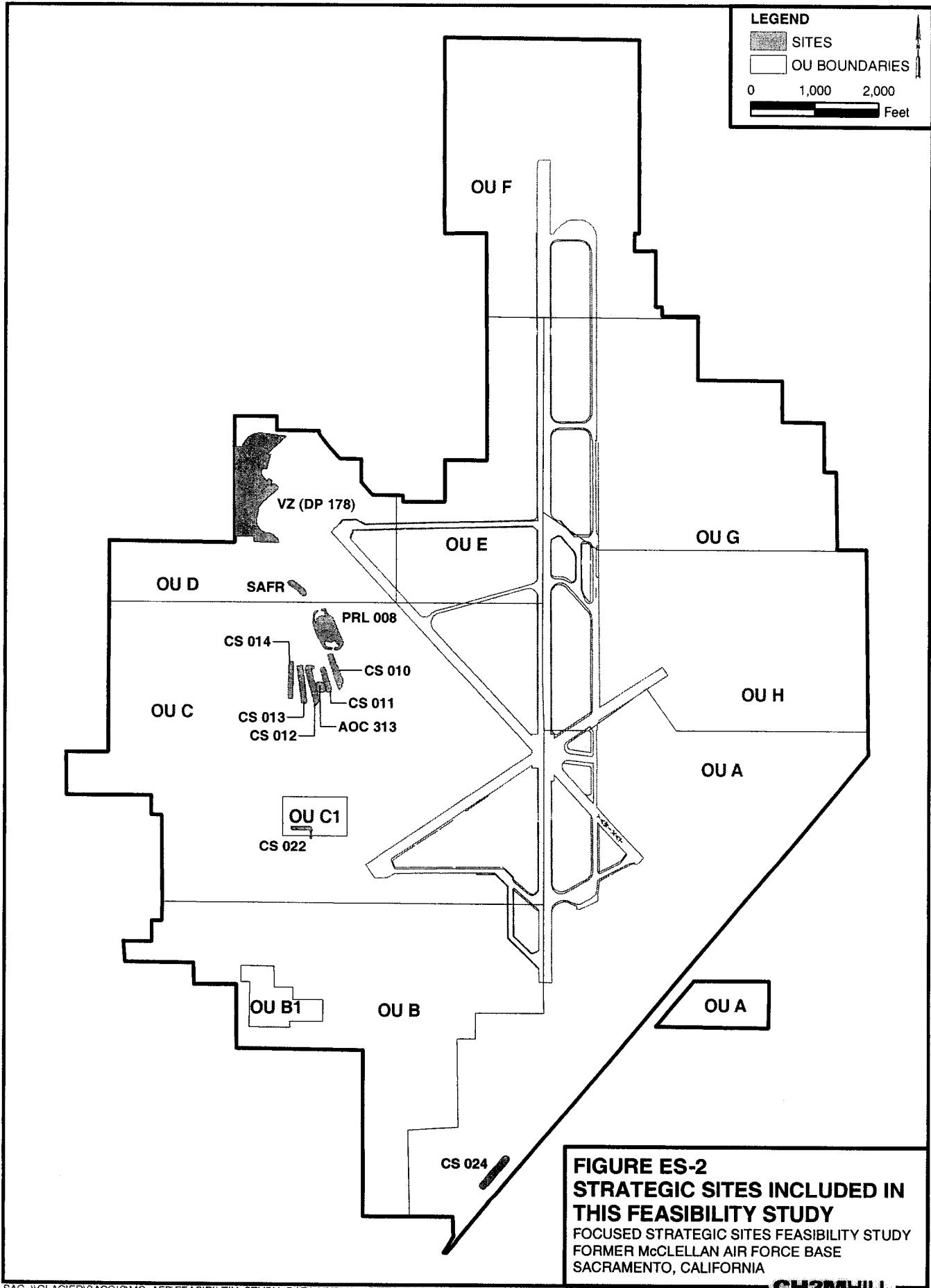


FIGURE ES-2
STRATEGIC SITES INCLUDED IN
THIS FEASIBILITY STUDY
FOCUSED STRATEGIC SITES FEASIBILITY STUDY
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

Remedial Action Objectives

Remedial Action Objectives (RAOs) define the extent to which the sites will require cleanup to meet the objectives of protecting human health and the environment. These RAOs reflect the contaminants of concern (COCs), exposure routes and receptors, and acceptable contaminant concentrations or range of concentrations for contaminants in soil and soil gas.

The first RAO is for the protection of human health from exposure to contaminants in soil and soil gas with a total excess cancer risk greater than the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) risk range (10^{-4} to 10^{-6}) or a hazard quotient (HQ) of 1 for the current and reasonably anticipated future land use scenario, with a point of departure of 10^{-6} for determining remediation goals for alternatives. If remediation is required, this RAO will be attained if the concentration of each contaminant is within the range of preliminary cleanup goals (PCGs) as presented in Tables ES-1 and ES-2 for the selected land use scenario for these parcels and immediately adjacent parcels.

Alternatively, the RAO is achieved if engineering or land use controls eliminate human exposure to contamination for the anticipated future land use.

The second RAO is to prevent impacts to surface water and groundwater quality. For non-VOCs, this RAO will be attained if the concentration of each contaminant is less than its respective PCG for the protection of surface water and groundwater as presented in Sections 2.3.4.2 and 2.3.4.3. Alternatively, the RAO is achieved if engineering controls eliminate contaminant migration to surface water or groundwater. For VOCs, impacts to surface water are not expected because of the inherent volatility of VOCs. Impacts to groundwater will be addressed using SVE as the presumptive remedy. The SVE systems were previously installed as removal actions at the disposal pits and AOC 313 (FTA), and continue to operate at this time. STOP evaluations will be prepared at the appropriate time to determine if the SVE systems can be shutdown.

The third RAO is to prevent impacts to ecological receptors. Land use at the 11 Strategic Sites is currently, and is expected to remain into the foreseeable future, industrial or industrial/commercial with no significant ecological habitat onsite; however, sensitive habitat does exist adjacent to PRL 008, the SAFR, and the VZ. This RAO will be attained by eliminating offsite migration of contaminants.

Preliminary Cleanup Goals

The selection of the PCGs for contaminated soil and soil gas is summarized in this section and is described in detail in Section 2. PCGs have been developed to address the following soil and soil gas depth intervals and receptors:

- Protection of human health from contaminants in SSG for VOCs and in surface and shallow soils for non-VOCs (ground surface to 15 feet below ground surface [bgs]).
- Protection of groundwater from non-VOC contaminant migration in soil from the ground surface to the water table. While VOCs can also migrate to groundwater, the

potential threat to groundwater from VOCs is currently being addressed under the ongoing soil vapor extraction (SVE) program.

- Protection of surface water from non-VOC contaminants in runoff from surface soil (0 to 1 foot bgs). Because of the inherent volatility of VOCs, surface water impacts are not expected for these contaminants.

A range of possible PCGs was identified with the objective being to attain the RAOs. The PCGs for protection of human health, groundwater, and surface water that were selected to evaluate the alternatives are summarized in Tables ES-1 and ES-2 for non-VOCs and VOCs, respectively. Other values may be selected as the cleanup levels in the ROD.

TABLE ES-1

Summary of Preliminary Cleanup Goals – Non-VOCs in Soil

Focused Strategic Sites Feasibility Study, Former McClellan Air Force Base, Sacramento, California

COCs	PCGs			
	Protection of Human Health in Surface and Shallow Soil (0 to 15 feet bgs)		Protection of Groundwater (0 to 30 feet bgs) ^f	Protection of Surface Water in Surface Soil (0 to 1 foot bgs)
Metals (mg/kg)	Unrestricted Use Scenario	Industrial Use Scenario		
Aluminum ^a	35,000	920,000	84,000	15,000
Antimony	14	410	1,000	190
Arsenic	4.9 ^b	4.9 ^b	990	5.8
Barium	6,900	67,000	7,800	3,200
Cadmium	6.2	450	1,400	4.0
Chromium, Hexavalent	110	450	270	350
Chromium, Total	2,600	5,500	83,000	1,600
Copper	1,300	41,000	250,000	130
Iron ^a	39,695 ^b	310,000	91,000	24,000
Lead	150	800	4,300	140
Manganese	1,596 ^b	19,000	980,000	5,200
Nickel	430	20,000	130,000	770
Silver	170	5,100	3,500	23
Thallium	2.8	67	140	54
Zinc ^a	3,100	310,000	140,000	1,700
Radionuclides (pCi/g) ^b				
Cesium 137	6	11	20,000	6,400
Radium 226	2.3	3.7	500	160
Thorium 232	312	1,902	1,500	480
Plutonium 239	259	1,400	1,500	480
Uranium 238	77	183	2,000	640
SVOCs (mg/kg)				
Aldrin	0.0092	0.10	—	0.0041
Benzo(a)anthracene	0.088	2.1	—	0.14
Benzo(a)pyrene	0.011	0.21	—	0.14

TABLE ES-1

Summary of Preliminary Cleanup Goals – Non-VOCs in Soil
Focused Strategic Sites Feasibility Study, Former McClellan Air Force Base, Sacramento, California

COCs	PCGs			
	Unrestricted Use Scenario	Industrial Use Scenario	Protection of Groundwater (0 to 30 feet bgs) ^f	Protection of Surface Water in Surface Soil (0 to 1 foot bgs)
Benzo(b)fluoranthene	0.11	2.1	—	0.14
Benzo(k)fluoranthene	0.11	21	—	0.14
Benzyl alcohol ^a	37	180,000	—	— ^g
Bis(2-ethylhexyl)phthalate	12	120	—	58
Chlordane	0.12	6.5	—	0.018
Chrysene ^c	0.88	210	—	0.14
DDD	0.50	10	—	0.027
DDE	0.49	7	—	0.019
DDT	0.47	7	—	0.019
Dibenzo(a,h)anthracene	0.021	0.21	—	0.14
1,2-Dichlorobenzene ^c	190	4,100	—	770
1,4-Dichlorobenzene ^d	0.015	0.15	—	160
Dieldrin	0.0058	0.11	—	0.0045
2,4-Dimethylphenol	13	12,000	—	13,000
2,4-Dinitrotoluene	0.0063	1,200	—	1.6
2,6-Dinitrotoluene	0.0024	620	—	1.6
1,4-Dioxane	0.0035	160	0.0015	42
Indeno(1,2,3-cd)pyrene	0.12	2.1	—	0.14
4-Methylphenol	19	3,100	—	— ^g
Naphthalene ^d	0.047	0.60	—	670
N-nitroso-di-n-propylamine	0.00012	0.25	—	0.16
PCBs	0.063	0.74	—	0.0054
2,3,7,8-TCDD	0.0000011	0.000016	—	0.00000042
TPH^e (mg/kg)				
TPH-D	—	—	3,900/100	3,200/100
TPH-G	—	—	220/10	160/10

- ^a US EPA Region 9 recommends that a “ceiling limit” of 1E+05 be used when the risk-based value is higher. Documentation accompanying the PRGs also acknowledges that this recommendation is not a universally accepted approach.
- ^b The selected PCG is based on the background concentration in soil.
- ^c The listed risk-based concentrations exceed the soil saturation concentration (US EPA Region 9 default soil properties for PRGs for), chrysene (3.8 mg/kg) and 1,2-dichlorobenzene (600 mg/kg).
- ^d For 1,4-dichlorobenzene and naphthalene, the soil concentration protective of indoor air is used as the PCG.
- ^e Two sets of PCGs were developed for TPH as described in Section 2. No PCGs were developed for protection of human health.
- ^f With the exception of 1,4-dioxane, PCGs were not developed for SVOCs because they are not predicted to impact groundwater.
- ^g PCGs for the protection of surface water were not developed for benzyl alcohol and 4-methylphenol because no limiting water quality criteria was identified.
- ^h Unrestricted Use and Industrial Use PCGs for radionuclides are inclusive of background.

TABLE ES-2

Summary of Preliminary Cleanup Goals – VOCs in Shallow Soil Gas

Focused Strategic Sites Feasibility Study, Former McClellan Air Force Base, Sacramento, California

COCs	Protection of Human Health in SSG (0 to 15 feet bgs) AFRPA PCGs (ppbv)	
	Unrestricted Use Scenario	Industrial Use Scenario
Benzene	290	2,300
Carbon tetrachloride	170	1,200
Chloroethane	9,100	83,000
1,4-Dichlorobenzene	260	2,700
1,1-Dichloroethane	4,600	36,000
1,2-Dichloroethane	140	1,600
1,1-Dichloroethene	340,000	1,900,000
cis-1,2-Dichloroethene	100,000	690,000
Ethyl benzene	5,400	45,000
Naphthalene	74	960
Tetrachloroethene (PCE)	1,000	7,100
Trichloroethene (TCE)	2,900	22,000
1,2,4-Trimethylbenzene	10,000	83,000
1,3,5-Trimethylbenzene	10,000	83,000
Vinyl chloride	220	1,500

Remedial Alternatives

Technical process options (such as excavation, institutional controls, and soil vapor extraction) were assembled into remedial alternatives to address non-VOC and VOC contamination at the 11 Strategic Sites addressed in this FS. The assembled alternatives were screened against the criteria of effectiveness, implementability, and cost. Alternatives with the most favorable composite evaluation of all factors were retained for more detailed evaluation against additional Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) criteria.

The remedial alternatives are intended to address a broad range of site conditions and contaminant types. However, because site and contaminant conditions vary between sites, some alternatives may not be appropriate for some sites.

Assembly of Alternatives

Seven alternatives were identified. The assembled alternatives consist of the following:

- Alternative 1 – No Action (Unrestricted Land Use)
- Alternative 2 – Institutional Controls (Restricted Land Use)
- Alternative 3 – Composite Cap (Restricted Land Use)
- Alternative 4 – Excavation/Ex situ Treatment/Backfill (Restricted Land Use)

- Alternative 5 – Excavation/Consolidation Unit (Restricted Land Use)
- Alternative 6 – Excavation/Ex situ Treatment/Consolidation Unit (Restricted Land Use)
- Alternative 7R – Excavation/Disposal (Restricted Land Use) and Alternative 7U – Excavation/Disposal (Unrestricted Land Use)

Based on the McClellan Reuse Plan, all of the 11 Strategic Sites addressed in this FS are located within areas designated for industrial or industrial/commercial land use.

Therefore, most of the alternatives are evaluated with respect to industrial land use PCGs, and result in restricted land use. However, Alternative 7U is evaluated with respect to lower PCGs that support unrestricted land use. Although not specifically evaluated in this FS, all of the other excavation alternatives could be configured to achieve unrestricted land use at the sites being excavated (restricted land use would still be the result for the consolidation unit area).

Based on the screening of alternatives using the criteria of cost, effectiveness, and implementability, Alternatives 2 and 4 were eliminated from the selection because these alternatives were not effective at attaining RAOs. In addition, Alternative 4 may not be compliant with applicable or relevant and appropriate requirements (ARARs) because ex situ treatment of the waste was not considered to be wholly effective at meeting the PCGs that would allow the treated material to be backfilled and still be protective of human health and/or the environment.

The five remaining alternatives were retained for the detailed analysis and are summarized below:

- **Alternative 1 – No Action (Unrestricted Land Use).** The No Action alternative provides a baseline for comparing other alternatives. No remedial activities are implemented, and no cost is associated with this alternative. The No Action alternative is required to serve as a baseline for comparison of other alternatives. This alternative is not considered viable because it does not satisfy the RAOs nor is it consistent with ARARs.
- **Alternative 3 – Composite Cap (Restricted Land Use).** Under Alternative 3, an individual Strategic Site with contaminated soil would be covered with an engineered cap to eliminate human and ecological receptor exposure pathways, reduce infiltration of precipitation, and minimize potential for contaminants to leach to groundwater. In addition to the cap itself, this alternative also includes post-ROD sampling, SVE/vapor barriers, institutional controls, and monitoring/enforcement.
- **Alternative 5 – Excavation/Consolidation (Restricted Land Use).** Alternative 5 consists of individual site excavation and subsequent consolidation of soil from multiple sites into an onbase consolidation unit. Alternative 5 also includes post-ROD sampling, SVE, institutional controls, and monitoring/enforcement. Under Alternative 5, the resulting land use at the excavated site and at the consolidation unit is restricted.
- **Alternative 6 – Excavation/Ex Situ Treatment/Consolidation (Restricted Land Use).** Alternative 6 consists of individual site excavation, ex situ treatment of the excavated soil (as necessary), and subsequent consolidation of soil from multiple sites into an onbase consolidation unit. Alternative 6 also includes post-ROD sampling, SVE,

institutional controls, and monitoring/enforcement. Under Alternative 6, the resulting land use at the excavated site and at the consolidation unit is restricted.

- **Alternative 7R – Excavation/Disposal (Restricted Land Use) and Alternative 7U – Excavation/Disposal (Unrestricted Land Use).** Under Alternatives 7U and 7R, sites with contaminated soil and/or debris would be excavated and then transported to an off base landfill for disposal. Alternatives 7U and 7R also include post-ROD sampling, SVE, institutional controls, and monitoring. Alternative 7U uses a lower set of PCGs (unrestricted use) as compared to Alternative 7R (industrial use). Under Alternative 7U the resulting land use is unrestricted, and under Alternative 7R the resulting land use is restricted.

Detailed and Comparative Analyses

The purpose of the detailed analysis is to provide sufficient information to allow for comparisons among the different alternatives based on the criteria specified in the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (U.S. Environmental Protection Agency [EPA], 1988).

The nine CERCLA evaluation criteria include:

1. Overall Protection of Human Health and the Environment
2. Compliance with ARARs
3. Long-term Effectiveness and Permanence
4. Reduction of Toxicity, Mobility, or Volume through Treatment
5. Short-term Effectiveness
6. Implementability
7. Cost
8. State Acceptance
9. Community Acceptance

Criterion 8 (state acceptance) and Criterion 9 (community acceptance) are generally evaluated after public comment on the FS and the Proposed Plan, and could be used to modify aspects of the preferred alternative when preparing the Focused Strategic Sites ROD. Accordingly, only Criteria 1 through 7 are evaluated in the detailed and comparative analyses. The results of the analyses are summarized in Table ES-3 and Figure ES-3.

In general, Alternative 3 (Composite Cap) has the lowest associated cost, while Alternative 7R represents the highest cost for all sites. The costs for Alternative 7R are generally higher than those for Alternative 7U because the costs for institutional controls and groundwater monitoring are incurred in perpetuity under Alternative 7R, while the volume of soil to be excavated is only slightly less than for Alternative 7U. Because there is a minimal increase in excavation costs to achieve unrestricted use rather than restricted use, achieving unrestricted use at the Strategic Sites under Alternatives 5 and 6 should be considered. This increase in excavation costs would likely be offset by the decrease in costs for ongoing monitoring and institutional controls.

There is a considerable level of uncertainty associated with the cost for offsite disposal of contaminated material from CS 022, CS 024, and the VZ under Alternatives 7U and 7R. For

example, soil contaminated with just radionuclides or radionuclides and metals will cost about \$150 per cubic yard for disposal. Whereas, the cost for disposal of soil contaminated with radionuclides and organics can cost \$15,000 per cubic yard, and the cost for disposal of soil contaminated with radionuclides and dioxins/furans can cost up to \$50,000 per cubic yard. Obviously, even small changes in the actual volume of organic or dioxin/furan-contaminated soil can have a significant impact on cost. To evaluate the potential economic impact associated with this uncertainty, a sensitivity analysis was completed in Section 6 of the FS by comparing the costs for three different disposal scenarios. Based on the sensitivity analysis, the total present worth costs for Alternatives 7U and 7R range from \$377,630,000 and \$377,518,000 (for all 11 sites), respectively, for the reasonable best case scenario to \$530,997,000 and \$530,317,000 (for all 11 sites), respectively, for the reasonable worst case scenario. Estimated costs for the mid-range case are \$442,827,000 for Alternative 7U and \$442,715,000 for Alternative 7R. It should be noted that, during the recent industrial waste line investigation performed by Cabrera, radium 226 was detected at concentrations greater than background in samples that also contained ash and debris. This indicates the presence of soils that will likely have to be disposed of as soil contaminated with radionuclides and dioxins/furans.

It is likely that the same alternative will not be selected for all 11 sites. Therefore, two possible scenarios were developed and are presented in Section 6. The lowest cost scenario for the eleven Strategic Sites includes implementing Alternative 3 at CS 011, CS 012, CS 013, CS 014, AOC 313, PRL 008, CS 024, CS 022, and the VZ and applying Alternative 5 at CS 010 and the SAFR. The total present-worth cost associated with this scenario is \$39,000,000.

As previously indicated, implementing Alternative 3 at CS 011, CS 012, CS 013, CS 014, AOC 313, PRL 008, CS 024, CS 022, and the VZ is consistent with anticipated future land use (i.e., industrial). However, CS 024 and CS 022 are located within areas of the base that will likely be redeveloped into business parks. Capping of these two sites could affect or limit redevelopment in these areas. Based on this information, an alternate scenario would be to implement Alternative 3 at sites CS 011, CS 012, CS 013, CS 014, AOC 313, PRL 008, and the VZ, and implement Alternative 5 for CS 010, the SAFR, CS 022 and CS 024. The total present-worth cost associated with this scenario is \$51,998,000.

Subsequent to completing the feasibility study and after receiving input from the community and the regulatory agencies, the Air Force will identify a preferred alternative for each site. The preferred alternative will be presented to the public in a Proposed Plan.

TABLE ES-3
Comparative Analysis Summary for Strategic Sites
Focused Strategic Sites Feasibility Study, Former McClellan Air Force Base, Sacramento, California

Criteria*	Alternative 1:		Alternative 3:		Alternative 5:		Alternative 6:		Alternative 7R:		Alternative 7U:	
	No Action	All Sites	Composite Cap	All Sites Except CS 010 and SAFR	All Sites	Excavation/Consolidation	Excavation/Ex Situ Treatment/Consolidation	All Sites	Excavation/Disposal	All Sites	Excavation/Disposal	
Protection of Human Health and Environment	Would not reduce risk to human health or the environment.	Essentially eliminates direct exposure to contamination, but contamination is left in place so some potential for direct contact and impacts to groundwater remain. Institutional controls are necessary to ensure protection.	Provides higher level of protection relative to Alternative 3 because contamination is removed and consolidated into an engineered facility; however, some risk remains at the consolidation facility.	Provides higher level of protection relative to Alternative 5 because contamination is removed, treated, and consolidated into an engineered facility; however, some risk remains at the consolidation facility.	Provides higher level of protection relative to Alternative 6 because contamination is removed, treated, and consolidated into an engineered facility; however, some risk remains at the disposal facility and at the site which is excavated to industrial cleanup levels.	Provides higher level of protection relative to Alternative 6 because contamination is removed and transported to an engineered facility; however, some risk remains at the disposal facility.	Provides higher level of protection relative to Alternative 6 because contamination is removed and transported to an engineered facility; however, some risk remains at the disposal facility.	Provides higher level of protection relative to Alternative 6 because contamination is removed and transported to an engineered facility; however, some risk remains at the disposal facility.	Provides higher level of protection relative to Alternative 6 because contamination is removed and transported to an engineered facility; however, some risk remains at the disposal facility.	Provides higher level of protection relative to Alternative 6 because contamination is removed and transported to an engineered facility; however, some risk remains at the disposal facility.	Provides higher level of protection relative to Alternative 6 because contamination is removed and transported to an engineered facility; however, some risk remains at the disposal facility.	
Compliance with ARARs	Does not comply with ARARs.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.
Long-term Effectiveness and Permanence	Does not provide long-term effectiveness or permanence.	Provides lower degree of long-term protectiveness and permanence; dependent on proper maintenance of cap and institutional controls. SVE and vapor barriers provide very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 3; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 5; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.	Provides higher degree of long-term protectiveness and permanence relative to Alternative 6; dependent on proper maintenance of consolidation unit and institutional controls at site (residual contamination is left in place) and at consolidation unit. SVE provides very good long-term protectiveness and permanence with respect to SSG.
Reduction in Toxicity, Mobility, and Volume	Would not actively reduce toxicity, mobility, or volume. Reduction by natural degradation processes only.	Mobility is reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	Mobility is significantly reduced because the cap will minimize infiltration, but it will not be eliminated. SVE will reduce the toxicity, mobility, and volume of VOCs and some SVOCs.	
Short-term Effectiveness (Technical)	Not applicable for no action.	Minimal (if any) disturbance of contaminated material. Cap could be constructed relatively rapidly and institutional controls would provide immediate protection of human health and surface water.	Readily implementable; technical services and equipment readily available to construct cap, vapor barriers, and expand SVE.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.	Consolidation unit could be constructed relatively rapidly. Short-term risks during excavation, transport, and consolidation could be managed. Ex situ treatment would create additional short-term risks that could be managed.
Implementability	Not applicable for no action.	Readily implementable; technical services and equipment readily available to construct cap, vapor barriers, and expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to construct the consolidation unit and SVE. Implementability of ex situ treatment is uncertain due to the heterogeneity of the waste.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.	Readily implementable; technical services and equipment readily available for excavation and to expand SVE.

TABLE ES-3
Comparative Analysis Summary for Strategic Sites
Focused Strategic Sites Feasibility Study, Former McClellan Air Force Base, Sacramento, California

Criteria*	Alternative 1: No Action		Alternative 3: Composite Cap		Alternative 5: Excavation/Consolidation		Alternative 6: Excavation/Ex Situ Treatment/Consolidation		Alternative 7R: Excavation/Disposal		Alternative 7U: Excavation/Disposal	
	All Sites	All Sites Except CS 010 and SAFR	All Sites	All Sites	All Sites	All Sites	All Sites	All Sites	All Sites	All Sites	All Sites	All Sites
Cost	Not applicable for no action.	Unrestricted Land Use	Restricted Land Use	Unrestricted Land Use	Restricted Land Use	Unrestricted Land Use	Restricted Land Use	Unrestricted Land Use	Restricted Land Use	Unrestricted Land Use	Restricted Land Use	Unrestricted Land Use
Implementability (Administrative)	Implementation uncertain; there are unresolved issues associated with permitting by the RICS and State licensing of a capped disposal pit that potentially contains radionuclides upon property transfer.	Implementation uncertain; there are unresolved issues associated with permitting by the RICS and State licensing of a consolidation unit that would potentially receive radionuclide-contaminated material upon property transfer. Additionally, the State and/or EPA may need to approve an adjustment of the national treatment standards.	Implementation of this alternative could facilitate remediation of subsequent McClellan sites by accepting additional contaminated soil into the consolidation unit.	The site-specific costs for implementing this alternative are provided below. There is a moderate level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.	The site-specific costs for implementing this alternative are provided below. There is a moderate level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.	The site-specific costs for implementing this alternative are provided below. There is a high level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.	The site-specific costs for implementing this alternative are provided below. There is a high level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.	The site-specific costs for implementing this alternative are provided below. There is a high level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.	The site-specific costs for implementing this alternative are provided below. There is a high level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.	\$18,804,000	\$18,967,000	\$18,967,000
CS 010 (PW ₃₀)	\$0	—	\$4,092,000	\$12,719,000	\$12,719,000	\$12,719,000	\$12,719,000	\$12,719,000	\$12,719,000	\$27,374,000	\$27,374,000	\$27,374,000
CS 011 (PW ₃₀)	\$0	—	\$2,787,000	\$9,686,000	\$9,686,000	\$9,686,000	\$9,686,000	\$9,686,000	\$9,686,000	\$14,206,000	\$14,206,000	\$14,206,000
CS 012 (PW ₃₀)	\$0	—	\$3,361,000	\$33,612,000	\$33,612,000	\$33,612,000	\$33,612,000	\$33,612,000	\$33,612,000	\$40,857,000	\$40,857,000	\$40,857,000
CS 013 (PW ₃₀)	\$0	—	\$3,649,000	\$21,348,000	\$21,348,000	\$21,348,000	\$21,348,000	\$21,348,000	\$21,348,000	\$62,326,000	\$62,326,000	\$62,326,000
CS 014 (PW ₃₀)	\$0	—	\$3,666,000	\$17,680,000	\$17,680,000	\$17,680,000	\$17,680,000	\$17,680,000	\$17,680,000	\$51,041,000	\$51,041,000	\$51,041,000
CS 022 (PW ₃₀)	\$0	—	\$3,481,000	\$11,089,000	\$11,089,000	\$11,089,000	\$11,089,000	\$11,089,000	\$11,089,000	\$25,614,000	\$25,614,000	\$25,614,000
CS 024 (PW ₃₀)	\$0	—	\$2,877,000	\$8,831,000	\$8,831,000	\$8,831,000	\$8,831,000	\$8,831,000	\$8,831,000	\$20,817,000	\$20,817,000	\$20,817,000
FTA (PW ₃₀)	\$0	—	\$2,169,000	\$3,180,000	\$3,180,000	\$3,180,000	\$3,180,000	\$3,180,000	\$3,180,000	\$8,018,000	\$8,018,000	\$8,018,000
PRL 008 (PW ₃₀)	\$0	—	\$3,259,000	\$12,033,000	\$12,033,000	\$12,033,000	\$12,033,000	\$12,033,000	\$12,033,000	\$34,322,000	\$34,322,000	\$34,322,000
SAFR (PW ₃₀)	\$0	—	—	\$2,842,000	\$2,842,000	\$2,842,000	\$2,842,000	\$2,842,000	\$2,842,000	\$4,170,000	\$4,170,000	\$4,170,000
VZ (PW ₃₀)	\$0	—	\$4,869,000	\$27,533,000	\$27,533,000	\$27,533,000	\$27,533,000	\$27,533,000	\$27,533,000	\$112,205,000	\$112,205,000	\$112,205,000

Notes:

- State and community acceptance are modifying criteria would be evaluated after the Proposed Plan public comment period.

Disposal of some classes of contaminants (i.e., radionuclides and dioxins/furans) may not be possible.

Implementation uncertain; there are unresolved issues associated with permitting by the RICS and State licensing of a consolidation unit that would potentially receive radionuclide-contaminated material upon property transfer. Additionally, the State and/or EPA may need to approve an adjustment of the national treatment standards.

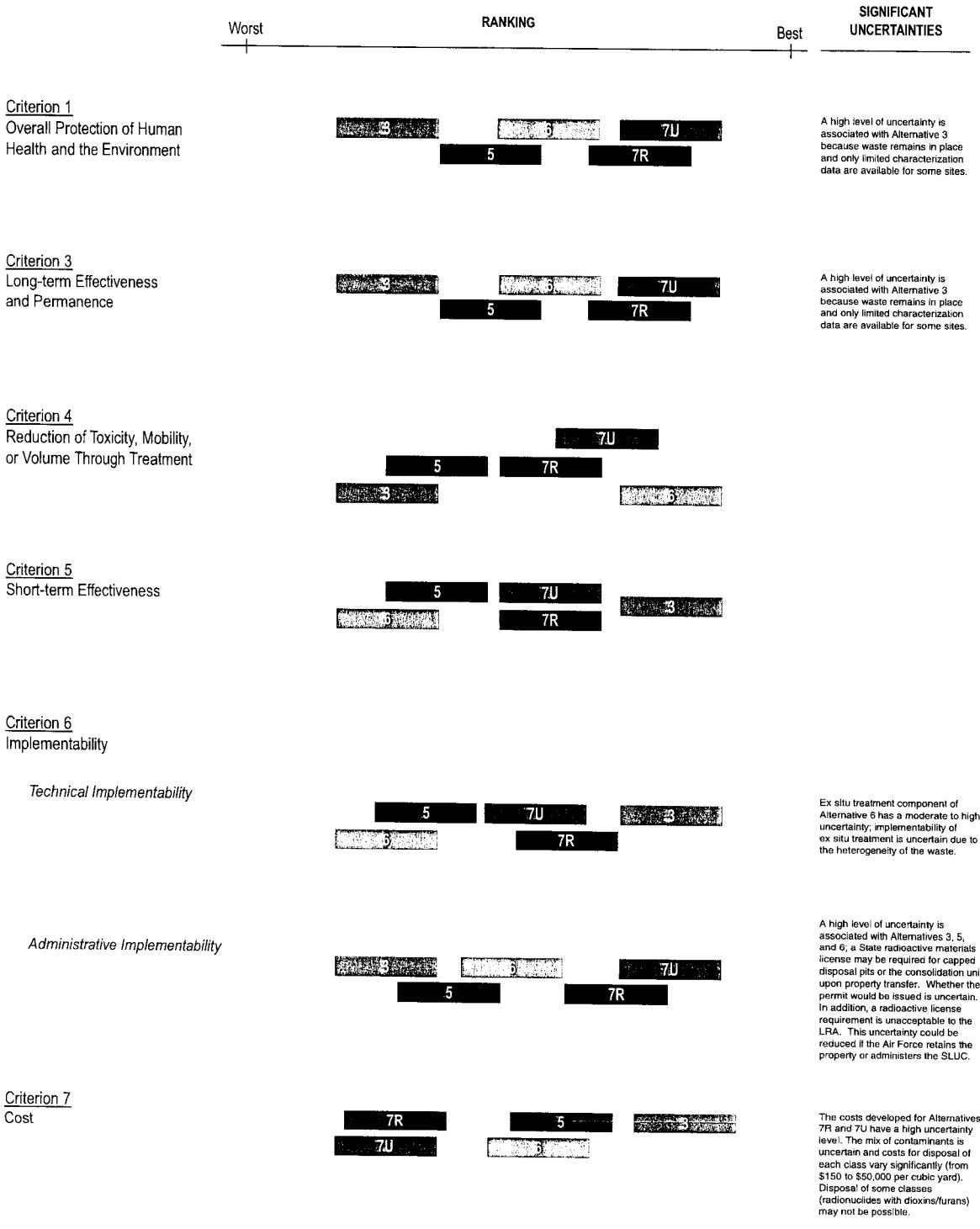
Implementation of this alternative could facilitate remediation of subsequent McClellan sites by accepting additional contaminated soil into the consolidation unit.

The site-specific costs for implementing this alternative are provided below. There is a moderate level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.

The site-specific costs for implementing this alternative are provided below. There is a high level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.

The site-specific costs for implementing this alternative are provided below. There is a high level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.

The site-specific costs for implementing this alternative are provided below. There is a high level of uncertainty associated with these costs because it is unclear how much treatment will be required. Assumes soil from all eleven of the Strategic Sites is consolidated within the consolidation unit. Site-specific costs associated with construction of the consolidation unit will increase as the total volume of soil consolidated decreases.



Notes:

- Alternative 3 - Composite Cap (Restricted)
- Alternative 5 - Excavation/Consolidation (Restricted)
- Alternative 6 - Excavation/Ex Situ Treatment/Consolidation (Restricted)
- Alternative 7R - Excavation/Disposal (Restricted)
- Alternative 7U - Excavation/Disposal (Unrestricted)

Criterion 4: All alternatives include SVE, but only Alternative 6 includes onsite soil treatment. Reductions in toxicity, mobility, and/or volume for contaminants in soil under Alternatives 3, 5, 7R, and 7U are due to engineering controls or physical removal rather than treatment.

Criterion 2: Criterion 2 is not included on this table because all alternatives comply with ARARs.

Criterion 7: Ranked by Total Cost (PV₆₀)

FIGURE ES-3
RELATIVE RANKING OF ALTERNATIVES
FOCUSED STRATEGIC SITES FEASIBILITY STUDY
FORMER MCCLELLAN AIR FORCE BASE, SACRAMENTO, CALIFORNIA

APPENDIX E

***Responses to Comments—Draft Final
Focused Strategic Sites Feasibility Study***

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: Water Board–James Taylor

General Comment						Response	
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment
2							<p>Regional Board staff has worked to clarify the issue of TPH cleanup levels in our comments on the Draft Final LRA Initial Parcel ROD #2 (ref: RWQCB comment letter dated 10 April 2006, and Air Force response to Specific Comment #6 - email from Mr. Steve Mayer dated 20 April 2006). Our Specific Comment 17 addresses the same issues, specifically TPH cleanup levels that are protective of groundwater and human health. In the response to these issues, in the 20 April 2006 email, the Air Force agreed with the Regional Board staff that use of the proposed TPH cleanup levels for protection of groundwater quality (3,900 mg/kg for TPH as diesel and 220 mg/kg for TPH as gasoline) for soil deeper than 30 feet below ground surface (bgs) is not appropriate. The depth interval to apply the TPH cleanup levels was changed from '1 foot bgs to groundwater' to '1 ft bgs to 30 feet bgs'. If the Air Force wants to include TPH cleanup levels for protection of groundwater for soils deeper than 30 feet bgs, then more conservative cleanup levels for protection of groundwater must be developed. The Air Force's 20 April 2006 email also proposed using the use of indicator compounds such as BTEX and PAHs to demonstrate protection of human health in shallow soils (1 to 15 feet bgs). Regional Board staff concurs with the use of this approach on a case-by-case basis. Please revise the FS to be consistent with the approach developed to resolve the TPH issues presented in the 20 April 2006 email.</p> <p>This sentence contains a reference to 'consolidation' as a component of the remedy. Alternatives 7R and 7U are for excavation and disposal only. Please delete consolidation from this sentence.</p>
3			5.2.7.5	5-35		First	<p>Responses to Remaining Comments</p> <p>Regional Board staff has reviewed the rest of the Responses to Comments and has determined that our comments on the draft (letter dated 23 January 2006) have been adequately addressed.</p>
4							<p>No response required.</p>

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment	No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
	1							Response to Comment 1 Evaluation of VOCs at Landfill and Disposal Sites	<p>It is important to note that regardless of the uncertainty in characterizing VOC contamination at the disposal pits, the AF has already implemented SVE removal actions at the sites. Therefore, any evaluation of the risk associated with VOCs at the sites using historical data are uncertain and likely overestimated.</p> <p>AFRPA agrees that there is some uncertainty with the application of the J&E model to some disposal pit sites. However, AFRPA does not agree that the model is inapplicable. Each of the disposal pits is covered with soil fill, ranging in thickness from 6 to 11 feet, and much of the material in the disposal pits is soil. While landfill gas (methane and carbon dioxide) has historically been detected at some disposal pits, it is likely that the gas is produced from the degradation of petroleum compounds rather than municipal organic waste. The SVE systems currently operating at these sites are facilitating aerobic degradation of the petroleum contamination. SVE is a component of the remedial alternatives and will continue to operate, and landfill gas monitoring systems will be installed if the landfills are capped or consolidated. Therefore, methane generation will likely be significantly reduced.</p> <p>The discussion of the uncertainties associated with the human health risk screenings in Section 1.3 in Appendix C has been modified. Text is now as follows:</p> <p>"Human Health Risk Screening: Due to the heterogeneous nature of the disposal pit wastes, complete site characterization is impractical. Because the maximum concentrations of contaminants may not have been identified, the risks calculated for each site may be underestimated. In addition, there is some uncertainty in the use of the Johnson and Ettinger (J&E) model to evaluate the indoor air pathway for disposal pit sites. The J&E model was developed for sites with soil. The model does not adequately account for the presence of significant lenses of ash or debris, or the production of landfill gas. This may result in the underestimation in predicting the migration and emission of VOCs into indoor air, which would result in the underestimation of the risk estimates for some disposal pit sites."</p>

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment					
No.	Appendix	Section	Page	Paragraph	Sentence
Other					Comment
					Response

The following text has been added to Section 2.3.2.1 as the third paragraph.
There is some uncertainty in the use of the Johnson and Ettinger (J&E) model to evaluate the indoor air pathway for disposal pit sites. The J&E model was developed for sites with soil. The model does not adequately account for the presence of significant lenses of ash or debris, or the production of landfill gas. This may result in the underestimation in predicting the migration and emission of VOCs into indoor air, which would result in the underestimation of the risk estimates for some disposal pit sites.
Footnote "a" has been added to the PCG for industrial use Table ES-1 to indicate that the PCG for industrial use is greater than 100,000 mg/kg.

The Air Force believes it is beneficial to maintain the risk-based values in the tables to allow the reader to qualitatively assess the risk associated with a contaminant concentration. Upon review of the site characterization data for the sites included in this FS, no reported concentrations of aluminum and zinc exceeded 42,500 mg/kg and 11,000, respectively. In addition, no reported iron concentrations in the upper 15 feet of the vadose zone exceeded 100,000 mg/kg. Therefore, it is unlikely that the ceiling value will be exceeded at any site.

Response to Comment 4 Table ES-1, Summary of Preliminary Cleanup Goals

- a. The Air Force added a footnote to Table ES-1 noting that the ceiling limit of 100,000 mg/kg (10% by weight concentration) should be applied for aluminum, iron, and zinc; however, values in the table were not revised. The notation should be added for included benzyl alcohol. For feasibility studies, USEPA and DTSC agreed to the Air Force proposal to use the USEPA Region 9 Industrial Preliminary Remediation Goals (PRGs; including Cal-modified values) for soil at McClellan for evaluation of the industrial exposure scenario. The PRG for a chemical is 10,000 mg/kg if the risk-based concentration exceeds this ceiling limit concentration. Certain exposure assumptions on which PRGs are based might not be valid at higher concentrations of contamination. HERD defers selection of preliminary cleanup goals to the DTSC project manager.

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment						Comment	Response
No.	Appendix	Section	Page	Paragraph	Sentence	Other	
5					Response to Comment 5 Conceptual Model, Figures 1-4a and 1-4b, and Sections 1.5.2 to 1.5.7.		a and b. Information on current measures taken to prohibit and/or prevent ground water has been added to Section 1.5.6.2.
							c. Although the comment appears to be incomplete, the Air Force reiterates that ecological areas of concern at the former McClellan Air Force Base have been previously identified and agreed upon between the Air Force and regulatory/resource agencies. None of the Focused Strategic Sites were identified as providing significant ecological habitat onsite. All of the 11 Strategic Sites are industrial in nature and support only limited non-native annual grassland habitat, and most are disturbed, paved, and/or developed. Based on the McClellan Reuse Plan (EDAW 2000) and the McClellan Special Planning Area ordinance, all of the sites will continue to be used for industrial/commercial purposes. Based on this information, exposure pathways for ecological receptors are considered to be incomplete.
							The text already states that "metals were identified as COCs if the concentrations exceeded the "combined" background concentration and screening levels." No changes to the text have been made.
9		1.6.1			Second		We recommend that the text stating that screening levels did not include consideration of criteria used for PCGs, such as background concentrations and analytical detection limits, be revised. The text should clarify that metals, namely arsenic, exceeding screening levels were not identified as COCs unless background concentrations also were exceeded (third paragraph).
						Response to Comment 15	Screening Levels, Contaminants of Concern (COCs), and Preliminary Cleanup Goals.
15			2.3.1	24			c. d and e. The Response provided explanations but the text of the FSS FS was not amended. We defer to the remedial project manager to determine how tentatively identified chemicals (TICs) and unidentified detected contaminants were addressed in the remedial investigation and how these, and VOCs excluded from the "short list" of analytes, will be addressed in the FSS FS and remedial actions. For example, because these contaminants contribute additional risks and uncertainty in characterization of site risk, risk managers might select a more protective cleanup goal for total cumulative risk from known contaminants.

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment						Response				
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response		
17		2.3.2	2-6		Response to Comment 17	Non-VOCs. (See additional comments, below, on Appendix B.)	a. The text in Section 2.3.2 has been modified as follows:			
							<p>a. We reiterate our recommendation that the text in this section clarify that the risk-based screening levels for non-VOCs were developed using methods in the OU A RICS and revised and updated per recommendations by USEPA and DTSC/HERD and meetings with the Air Force, particularly for the Initial Parcel #1 FS. Revisions in documents subsequent to the OU A RICS were not limited to toxicity factors. Important revisions included changes in background concentrations of metals, elimination of the root uptake pathway for all but six metals and use of different partition coefficients for those six metals, use of the USEPA method for estimating volatilization factors for emissions from soil to ambient air, and recalculation of the particulate emission factor.</p> <p>b. The text was revised as recommended for exceptions to the PRGs for several chemicals. However, additional text regarding uses of USEPA Region 9 PRGs should be revised to clarify that PRGs should not be used to "screen" out (eliminate) contaminants from evaluation in risk assessments submitted to DTSC.</p>	<p>The risk assessment assumptions and methodology used in this FS for developing the risk-based screening levels were consistent with the risk assessment procedures developed in the Final OU A RICS (Jacobs, 2001), the Initial Parcel FS #1 (CH2M HILL, 2003), and the Initial Parcel FS #2 (CH2M HILL, 2005a) with updated toxicity factors as appropriate.</p> <p>b. For metals, concentrations less than background were not included in the risk screening tables; PRGs, however, were not used to screen out contaminants from the risk screening evaluations. No changes have been made to the text.</p>	<p>Table 2-2, Selection of Preliminary Cleanup Goals for VOCs, and Table 2-3, Selection of Preliminary Cleanup Goals for Non-VOCs in Soil</p>	<p>The Air Force believes it is beneficial to maintain the risk-based values in the tables to allow the reader to qualitatively assess the risk associated with a contaminant concentration.</p>

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment						Response	
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment
25	B	B.3.2.2	25	Response to Comment:	Vapor Inhalation Pathway Screening Levels, Shallow Soil Gas PCGs. The Response stated that because the text indicated the characterization of the sites is uncertain, the sites will undergo detailed analysis in the FS. HERD considers the uncertainty associated with the characterization of these disposal sites to be of such a large degree that a quantitative risk assessment should not be conducted. Furthermore, the lack of definition of the extent and mass of each VOC contaminant at each of these sites and the generation of landfill gases preclude application of the model used by the Air Force to estimate indoor air risks. Therefore, risk estimates presented in this FS should be used only as general indicators of the contaminants and the nature of risks presented, and not as quantitative estimates of risk.		<p>It is important to note that regardless of the uncertainty in characterizing VOC contamination at the disposal pits, the AF has already implemented SVE removal actions at the sites. Therefore, any evaluation of the risk associated with VOCs at the sites using historical data are uncertain and likely overestimated.</p> <p>The following text has been added to the end of Section B.4:</p> <p>"The mode and parameter selection for the model are the points of contention as follows:</p> <ul style="list-style-type: none">• The Regulators propose that shallow soil gas PCGs be calculated using the infinite source, soil gas version of the J&E model (SG ADV). They believe this to be more health protective and warranted based on site characterization limitations and the lack of a cumulative risk assessment.• The large difference between the PCG for trichloroethene appears primarily attributed to the use of different (more conservative) toxicity criteria by EPA.• In the absence of a comprehensive remedial investigation for many sites, existing data are insufficient to support the development of a conceptual site model that would justify use of the finite source version of the J&E model.• When evaluating specific sites for closure, the Air Force should, with the consensus of the Remedial Project Managers, determine that the area of concern has been sufficiently characterized and with the three dimensional site characterization model sufficiently refined, employ site specific application of the finite source version of the J&E model, including site-specific soil physical properties, in determining whether a site continues to pose an unacceptable risk to human health via the vapor intrusion pathway."

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Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment								
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
27	B		27	Response to Comment	Table B-1, Chemical-Specific Toxicity Criteria. Most of the recommended revisions were made to criteria in the Table except for the following:		a. The oral RfD for toluene has been revised to 0.08 mg/kg-day in Table B-1 and risk-based soil concentrations have been revised accordingly.	
				a. The current USEPA Integrated Risk Information System (IRIS) oral Reference Dose (RfD) for toluene is 8E-02, not 2E-01; Table B-1 and risk-based concentrations should be revised accordingly.			b. 1,3-Dichloropropene was not detected at any of the Strategic Sites and is not included on Table B-5. For consistency, 1,3-dichloropropene has been removed from Table B-1.	
				b. The current Cal/EPA (Office of Environmental Health Hazard Assessment) inhalation cancer slope factor for 1,3-dichloropropene is 0.055 (mg/kg-day)-1, not 0.051; Table B-1 and risk-based concentrations should be revised accordingly.			c. Toxicity factors are reviewed and updated by USEPA and OEHHA as additional toxicological data for chemicals becomes available. The changes in toxicity factors may result in screening values and/or PCGs that are more or less health-protective. Toxicity factors for some chemicals included in Table B-1 have changed since the publication of the Draft FSS FS and corresponding updates have been made in Table B-1 and in the screening values and PCGs for direct contact pathways. However, although the USEPA reference concentration for hexane changed from 0.2 mg/m ³ to 0.7 mg/m ³ on December 23, 2005, the indoor air SSG PCG was not revised. Although there is uncertainty associated with the use of the outdated reference concentration, the SSG PCG is more health-protective than a revised PCG based on the new reference concentration and therefore, risk estimates based on the SSG PCG from the Draft FSS FS are conservative.	
							Because dibenzofuran was not detected at any of the Strategic Sites, the calculated risk-based soil and soil gas concentrations were not presented in Tables B-4 and B-5, respectively. For consistency, chemicals not presented in Table B-4 or B-5, including dibenzofuran, have been removed from Table B-1.	
							Risks for petroleum derived contaminants such as cyclohexane were estimated using hexane as a surrogate as recommended in Specific Comment 29 (Renzi) on the Draft FSS FS and as shown on the risk summary tables in Appendix C. The risk summary tables have been modified to evaluate 2,4-dimethylpentane using hexane as a surrogate.	
28	B		28d	Response to Comment	Chemical-Specific Factors—Volatilization Factor (VF). The Response indicated that dibenzofuran was evaluated for potential indoor air exposures. The VF was added to Table B-1; however, no risk-based soil or soil gas concentration was presented in Table B-4 or B-5. Please provide the risk-based concentrations.			
							Additional Contaminants of Potential Concern (COPCs). As suggested by HERD for fuel-related hydrocarbons and transformation products, hexane (n-hexane) was used as the chemical surrogate for alkanes and cycloalkanes with five to eight carbons. However, chemicals for which toxicity criteria are available, such as cyclohexane, should be evaluated separately for chemical-specific risk. We suggest that 2,4-dimethyl pentane be evaluated using hexane as a surrogate.	
29			29	Response to Comment				

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Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment						Response	
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment
30							Tables B-4 and B-5—Risk-Based Screening Concentrations, and corresponding Appendix C Tables 1-1 and 1-2. Many of the risk-based concentrations were revised to incorporate current toxicity criteria and changes in other inputs. The industrial PCG for barium should be revised to reflect the current oral RfD; the residential PCG was revised as appropriate. See Additional Comments, below, regarding risk-based concentrations.

The industrial screening levels and PCGs are based on the Region 9 PRGs presented in the 2004 version of the PRG Table. Industrial screening levels and PCGs will not be re-calculated; they will be updated when an updated Region 9 PRG Table is available.

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment						Response to Comment	Comment	Response
No.	Appendix	Section	Page	Paragraph	Sentence	Other		
31					Table B-4 and Appendix C Table 1-1.		a. The industrial screening levels have been updated as suggested.	<p>a. The methods and exposures assumptions used for the industrial PRGs and toxicity criteria used to calculate residential screening concentration were used to calculate the industrial screening level as recommended, but for only one chemical—benzo(g,h,i)perylene, the chemical cited in the example in the HERD comment. Because the risk-based screening levels are being used to estimate risk and hazard, as well as for preliminary cleanup goals, we reiterate our recommendation that industrial screening levels be provided for those chemicals for which unrestricted-use screening levels were estimated and vice versa, including PAHs (e.g., pyrene surrogate for non-cancer toxicity; ambient air cancer risk for naphthalene), DDD and DDE (non-cancer risk using surrogate), and 2,4- and 2,6-dinitrotoluene (carcinogenic risk based on cancer slope factor for mixture).</p> <p>2 Methyl/naphthalene. The Response stated that naphthalene would be used as the surrogate for 2 methyl/naphthalene. We concur with the use of the naphthalene RfC as a surrogate for inhalation exposures. However, the chemical-specific oral RfD available from IRIS for 2-methylnaphthalene, 4E 03 mg/kg/day, should be used to develop residential and industrial risk-based soil concentrations for direct contact pathways (excluding ambient air). For consistency with other PCGs, we recommend that the volatilization factor for ambient air be estimated using the USEPA Region 9 PRG default parameter values for soil properties and site conditions.</p> <p>b. 1,2,4-Trichlorobenzene. We reiterate our recommendation that risk-based soil concentrations based on carcinogenicity also be provided for residential and industrial scenarios. The Cal/EPA oral slope factor is 0.0036 (mg/kg-day)-1. Also, please provide the non-cancer risk-based soil concentration for unrestricted use (including the ambient air pathway). The industrial non-cancer risk-based soil concentration was corrected as recommended.</p> <p>c. Naphthalene. Non-cancer risk-based soil concentrations for soil and ambient air exposure</p>

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Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment						Comment	Response
No.	Appendix	Section	Page	Paragraph	Sentence	Other	
						pathways were revised for both scenarios and the unrestricted-use cancer risk-based soil concentration based on ambient air exposure was added. Please provide the cancer risk-based soil concentration for the industrial scenario.	
						b & c. See Additional Comment 9, below, regarding development of risk-based soil concentrations for the vapor intrusion to indoor air exposure pathway for naphthalene, trichlorobenzenes, and other relatively volatile SVOCs.	
						d. Appendix C, Table 11. Cancer risk-based screening concentrations for chemicals for which the non-cancer risk-based concentration is less than 10 or 100 times the 10-6 cancer risk-based concentration were not highlighted as recommended. We defer to the remedial project manager to ensure that residual concentrations do not exceed threshold concentrations for non-cancer toxic effects.	
32	C	1.1	32	32	32	Response to Comment The text of site-specific risk assessments (Conclusions, Sections 2.8, 3.8... 12.8) were amended to list additional chemical of concern (COCs; contaminants exceeding background concentrations and screening levels), but not chemicals of potential concern (COPCs; inorganic contaminants exceeding background, detected organic contaminants, and likely contaminants determined by site history and characterization). Furthermore, only COCs were evaluated for site risk. The Response stated that all COCs and COPCs will be evaluated in future sampling events. HERD recommends that the text of the FSS FS clarify that for future risk assessments at these sites, all COPCs will be included in the quantitative evaluation of risk. McClellan PCGs, PRGs, and generic screening criteria should not be used to eliminate contaminants from the quantitative risk assessment.	A conservative approach was used to identify additional contaminants of potential concern (COPCs) that may be associated with the disposal pits. The COPCs were not actually detected at some of the disposal pit sites and are therefore not included in the risk estimates. All COCs and COPCs will be evaluated for all future sampling events at the disposal pit sites. For a complete discussion regarding the identification of COPCs for disposal pit sites, please see Section 1.6.1.

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Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment	No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
	33	C						Response to Comment Site-Specific Risk Assessments, Sections 3.5, 4.5, ... 12.5 and Risk Summary Tables.	a. The text was added to the Introduction in Appendix C to include a discussion of the uncertainties associated with identifying COCs, the possible underestimation of the risk due to a limited list of COCs, and a discussion of the uncertainties associated with the risk estimates. In addition, text has also been added in Section 1.6.1 of the main text discussing the uncertainties associated with the risk estimates. b and c. We acknowledge the potential for "double counting" the risks associated with relatively volatile SVOCs that were detected in both soil and soil gas; however, the risk screening summaries are only intended to provide a qualitative evaluation of the potential risks at the Strategic Sites and are not intended or implied to be quantitative risk assessments. In addition, limited data has been collected at these sites and concentrations greater than the maximum concentrations used in the risk screening may exist at the sites. The uncertainty introduced by the limited data is likely greater than that introduced by the potential "double counting" of the risks associated with relatively volatile SVOCs. No changes have been made to the risk summaries.
	35	C		7				Response to Comment CS 022. We reiterate our recommendation that the inhalation risks associated with naphthalene be evaluated and presented.	Naphthalene was not detected in soil between 0 and 15 feet bgs at CS 022 and was therefore not included in the risk summary table. No changes have been made.
	39	C		11				Response to Comment Small Arms Firing Range, Footnote "C" to the Risk Summary Table was revised; however, the note should be revised to clarify whether the soil gas sample(s) were collected in the 0 to 15 feet bgs interval (i.e., "shallow" soil gas).	The footnote has been clarified and now states that "No VOCs have been detected in shallow soil gas samples (collected between 0 and 15 feet bgs) at the SAFFR".

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Comment By: DTSC-Barbara Renzi, M.S.

Specific Comment					
No.	Appendix	Section	Page	Paragraph	Sentence
Other					Comment
34-40	C				Response to Comments 34-40 ... 12.5, and Risk Summary Tables. Many of the revisions recommended by HERD were incorporated or addressed in the Response to Comments. However, HERD has several further comments on the site-specific risk assessments described in ADDITIONAL COMMENT 10, below.

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Comment By: DTSC-Barbara Renzi, M.S.

Additional Comment					
No.	Appendix	Section	Page	Paragraph	Sentence
					Other
1		1.5.2.1 & 1.5.6.3			Section 1.5.2.1, Conceptual Migration of Contaminants—VOC Contaminants, and Section 1.5.6.3, Shallow Soil Gas. Because of the importance of landfill gases in the migration of VOCs, we recommend that the last sentence of the last paragraph of Section 1.5.2.1 be revised to state, "...and produce molecular diffusion and pressure gradients in the subsurface." We also recommend that pressure gradients induced by landfill gases, including those below 15 feet bgs, be included in the discussion of VOC migration and emissions in Section 1.5.6.3.
2		1.5.2.2			Conceptual Migration of Contaminants—Non-VOC Contaminants. The last sentence of the second paragraph referred to "...the large extent of surface cover in the contaminant source areas..." and the first sentence of the third paragraph referred to "Areas with little pavement (such as a majority of the 11 Strategic Sites)." The nature of the "cover" and "pavement" should be clarified in these seemingly contradictory descriptions.
3		Figures 1-4a and 1-4b			Off-site sediment and surface water (Creeks/Drainages) were added as Affected Media/Exposure Media. Because surface soils have not been fully characterized (current and past site conditions; see discussion of previous Comment 5c, above), we recommend that biota also be included for human exposures to sediment and surface water contaminated by activities/conditions at the disposal pits and Fire Training Area (Figure 1-4a), similar to the conceptual model presented for Small Arms Firing Range (Figure 1-4b).
4					Section 1.6.1, Site Evaluation, fourth paragraph, and Section 2.3.1, fifth paragraph.
5		Table 2-2			According to the FSS FS, the USEPA Region 9 PRG for tap water will be used to determine whether 1,4-dioxane is a COC. Consistent with the development of soil and soil gas PCGs, we recommend that the more health-protective Cal/EPA cancer slope factor for 1,4-dioxane be used to develop the risk-based concentration for tap water.
					According to the Air Force table in Attachment B-2, the unrestricted use non-cancer risk-based concentration for naphthalene should be 3,200 ppbv.
					The use of the USEPA Region 9 PRG for tap water for 1,4-dioxane is consistent with the Groundwater Monitoring Program at McClellan. No changes to the text have been made.
					The typographical error in Table 2-2 has been corrected.

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Additional Comment						Response			
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response	
6	B	B.3.2.2			Vapor Inhalation Pathway Screening Levels, Shallow Soil Gas PCGs. The text of the second bullet should be revised to state that workers were assumed to be exposed eight hours per day not 24 hours per day (i.e., 20 m ³ per 8-hour workday). Also note that the third bullet cites an assumption that is not valid for these sites; the area of VOC contamination extends far beyond the area of the 1,100 ft ² residence and 15,000 ft ² industrial building assumed for indoor air modeling and development of the SSG PCGs.			Second Bullet: The Unit Risk Factors used in the model (see VLOOKUP Table in attachments to Appendix B) are based on 20 m ³ per day, 24 hours per day. An actual occupational receptor's inhalation rate may be higher, but the duration is likely to be less. Third Bullet: Agreed. The areal extent of contamination for the disposal pits is larger than the assumed building footprints. As a one-dimensional model, the contamination has no lateral boundaries. Additionally, the conservative assumption is that the contamination beneath the building extends to groundwater and all of this contamination can be pulled into the building. Contamination extending beyond the footprint of the building does not impact the model calculations.	

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Additional Comment					
No.	Appendix	Section	Page	Paragraph	Sentence
Comment					Response
		Tables B-4 and B-5, and Appendix C Tables 1-1 and 1-2, Risk-Based Concentrations for Soil and Soil Gas.		a.	The tables have been modified as suggested.
		a. Because it is not possible to have more than 100 percent of a compound in soil or soil gas, tabulated concentrations exceeding 100 percent should be replaced by ">10 ⁶ mg/kg" (benzoic acid, dimethyl phthalate) or ">10 ⁹ ppbv" (chlorodifluoromethane). The calculated risk-based concentration should be cited in a footnote explaining that the calculated concentration exceeded 100 percent in soil or soil gas.		b.	The industrial risk-based concentration for 1,4-dioxane is from the Region 9 PRG table and is based on EPA toxicity factors.
		b. 1,4-Dioxane was added to Table B-4; however, using the current OEHHA cancer slope factor (0.027 per mg/kg-day) HERD could not verify the industrial risk-based soil concentration. Please review and revise or explain the risk-based concentration.		c.	Please see response to Specific Comment 27. The SSG screening level for toluene has not been modified because the oral RID, not the inhalation RID, was revised.
		c. Soil gas risk-based concentrations, including Air Force (AFRP) shallow soil gas PCGs, should be reviewed and updated to be consistent with current toxicity criteria (e.g., toluene) and as discussed above for Section 2 and Appendix B.		d.	The direct contact screening levels are based on the McClellan calculated risk-based values and were calculated using the Region 9 VFs. Footnote "a" in Table B-5 has been modified to clarify this.
		d. Table B-5. Soil gas concentrations were estimated from soil concentrations protective of direct contact pathways for comparison with risk-based soil gas concentrations for the indoor air pathway only. The starting soil concentrations were USEPA Region 9 residential PRGs, not the McClellan-specific risk-based concentrations for soil.		(1)	"Dermal contact" has been deleted from footnote "a" in Table B-5.
		(2) HERD did not verify the calculations; however, we noted several revisions from the Draft version that were not explained or attributed to updated toxicity criteria. Please explain the revisions for chloroform, 1,1-dichloroethene, 1,1,2,2 tetrachloroethane, and trichloroethene (60-fold increase).		(2)	Chloroform: The inhalation RID was updated between the Draft and the Draft Final.
		(3) Define "(E)-2-Butene".		(3)	(E)-2-butene is an isomer of 2-butene (CAS 624-64-6).
		e. Risk-based soil gas concentrations should be		e.	Risks for petroleum derived contaminants such as cyclohexane were estimated using hexane as a surrogate as recommended in Specific Comment 29 (Renzi) on the Draft FSS FS and as shown on the risk summary tables in Appendix C.
		f. Agreed. In future documents a version of Table B-1		f.	Agreed. In future documents a version of Table B-1

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No.	Appendix	Section	Page	Paragraph	Sentence	Other	
							<p>developed for cyclohexane and 3-chloropropene for which chemical-specific toxicity criteria are available. Risk-based soil gas concentrations were not estimated for many petroleum derived contaminants using chemical surrogate methods as suggested by HERD. We recommend that a footnote be added to the table to indicate how risks associated with these contaminants will be assessed.</p> <p>f. Because of the large number of chemicals, toxicity criteria, chemical properties, scenario- and medium-specific risk-based concentrations that must be updated, revised, and reviewed, HERD requests that all future McClellan documents in which these data are used include: (1) a reference for the most recent McClellan document in which the data were used or presented; (2) a description of each specific revision; and (3) the reason(s) for the revision (e.g., updated inhalation slope factor per IRIS, or replaced EPA Reference Concentration with more protective Cal/EPA value).</p>

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Additional Comment

No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
8							<p>Appendix B and Tables B-4 and B-5, and Appendix C Tables 1-1 and 1-2, Risk-Based Soil Concentrations of SVOCs for Soil Vapor Intrusion into Indoor Air.</p> <p>In our previous comments, HERD recommended development of risk-based soil concentrations for vapor intrusion to indoor air pathway exposures for several relatively volatile SVOCs such as naphthalene and the dichlorobenzenes. Based on subsequent discussions, the Air Force included indoor air risk-based soil concentrations for 1,4-dichlorobenzene, naphthalene, and 1,2,4-trichlorobenzene in the Draft Final FSS FS (footnote "T" for Table B-4 and Appendix C Table 1-1) and used those concentrations as screening concentrations. However, no discussion or supporting information was provided regarding the derivation of the screening concentrations. HERD recommended risk-based soil concentrations be developed for the indoor air pathway for several other contaminants. Also, the USEPA risk assessor has recommended that a single risk-based soil concentration combining all exposure pathways be developed. Please see the discussion and comparative analysis in the attachment to this memorandum.</p> <p>HERD recommends that the text be amended to describe the derivation of the indoor air pathway risk-based soil concentrations. For sites at which SVOCs are major contributors to site risk, combined risks associated with indoor air and direct contact soil pathways should be considered. The HERD draft spreadsheet (February 23, 2006 Email) sent to the Air Force consultant for discussion purposes and added to the FSS FS Attachment B-3, "Regulatory Agency Proposed Preliminary Cleanup Goals" should be deleted.</p>	<p>Footnote "C" in Table 1-1 has been modified to clarify how the screening levels were derived for the relatively volatile SVOCs (1,4-dichlorobenzene, 2-methylnaphthalene, naphthalene, and 1,2,4-trichlorobenzene).</p> <p>Note that no attachment was provided with the memorandum.</p> <p>The HERD draft spreadsheet has been removed from the document.</p>

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Additional Comment						Response		
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
9	C							<p>a. Toxicity criteria and risk-based concentrations have been updated as described in responses to Specific Comments 27, 28, 29, 30, and 31 and Additional Comment 7.</p> <p>b. Comment noted. Discussions regarding the uncertainties associated with identifying COCs using limited data sets have been included throughout the document. All COCs and COPCs will be evaluated during any future sampling events as part of the remedial design and/or confirmation sampling.</p> <p>c. Manganese was excluded from the risk because the maximum concentration reported in the sample interval that is included in the risk estimates (0 to 11 feet bgs) was less than the background concentration. In addition, the metals presented on the summary tables for all sites are the maximum concentrations reported between 0 and 15 feet bgs. The metals included in the risk tables are the maximum concentrations reported between 0 and 10 feet bgs. The two tables are presenting different depth intervals and cannot be compared to each other. The soil gas results from the IC 19 SVE Expansion Project for PR 008 was inadvertently excluded from the risk table. The data has been added to the risk table and the risk numbers have been updated accordingly. A statement has been added to the site summaries in Appendix C stating when the shallow soil gas samples were collected relative to the startup of the SVE system.</p> <p>d. No response required.</p> <p>e. Comment noted. All COCs and COPCs will be evaluated during future sampling events as part of the remedial design and/or confirmation sampling.</p> <p>Furthermore, the text did not indicate if any of the soil gas samples were collected during period of operation and influence of the SVE system, including periods following cessation of operation before steady-state conditions were reached. Please review and correct these inconsistencies. We suggest that when two data sets are available, both data sets—baseline remedial investigation data and the most recent interim remedial action data—should be presented in separate columns in the Site Characterization Table or in two separate</p>

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Additional Comment

No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
							tables. The data used for risk estimates should be clearly identified.	<p>d. The Response did not incorporate HERD recommendations that VOCs which were detected in soil gas deeper than 15 feet, but were not sampled or not detected in the 0 to 15 feet bgs interval, be included in the risk assessment at the detection limit (e.g., carbon tetrachloride and PCE at CS 024, and vinyl chloride at the Vadose Zone). Because of ongoing remediation of VOCs at the sites, no revision is required for the Final version of the FFSS FS. However, we reiterate the recommendation for future site risk assessments.</p> <p>e. Because higher concentrations of contaminants at depths greater than 10 feet bgs were excluded from the risk assessment for soil (e.g., PCBs, dioxins and furans posing an estimated 3×10^{-5} risk detected at 12.5 feet bgs at PRL 008) and because a construction or utility worker exposure scenario was not evaluated, the remedial project managers should consider potential future grade changes and construction when evaluating soils deeper than 10 feet bgs for remedial action. Detected contaminants (COPCs) should be included in post-remediation confirmation sampling.</p>

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Comment By: DTSC-Kevin Depies

General Comment						Comment	Response
No.	Appendix	Section	Page	Paragraph	Sentence	Other	
1						<p>One issue that doesn't appear to be discussed is the potential changes in the groundwater monitoring program that likely will be needed if any of Alternatives 2, 3, 4, 5, 6, or 7R are selected as remedies. The current program is set up as a basewide groundwater monitoring of mostly volatile organic compound monitoring. To meet CERCLA and comply with ARARs, a more site-specific monitoring will need to be done for all potential contaminants in each disposal pit. Please confirm that this issue is addressed in the FSS FS, or if not, please add text (and possible additional costs to the estimates) discussing this. Presumably, the details for monitoring changes will be presented in a remedial Design Workplan.</p>	<p>Costs for groundwater monitoring, outside of the basewide groundwater monitoring program, are included for all of the alternatives evaluated where contamination is left in place. Details regarding the required groundwater monitoring will be provided in the Remedial Action Work Plan.</p>
2						<p>It is unclear if the practicality of establishing adequate compliance points for monitoring can be achieved with Alternatives 2, 3, 4, 5, 6, or 7R. This is especially the case for Alternatives 2 and 3, since disposal pit boundaries are uncertain as is the extent of contamination. In order to adequately monitor a disposal pit, monitoring points will have to be placed in uncontaminated locations yet be close enough to the disposal pit to adequately monitor any migrating contamination. This same problem likely arises if CS 10 is used for Alternatives 5 or 6, since full extent of CS 10 contamination may never be fully characterized with great certainty. It appears that adequate compliance monitoring points can be developed only if established in uncontaminated locations around the area where the waste will be left or placed.</p>	<p>During the remedial design phase, additional sampling will be done to further define the extent of contamination as necessary for implementation of the selected remedy. The results of this sampling can also be used to determine appropriate placement of compliance monitoring points.</p>
3						<p>In response to comments from DTSC and other agencies, the Air Force added the U.S. Environmental Protection Agency (USEPA) Preliminary Cleanup Levels (PCGs) for the vapor intrusion pathway to Appendix B. These PCGs were developed by USEPA with DTSC assistance. As a reiteration to our comments on the draft ESS FS, and other recent McAFB Feasibility Studies, Proposed Plans, and Records of Decision, (the Initial Parce #2 and Breakout Shallow Soil Gas), We believe the Air Force should acknowledge the regulator's position in the text for Appendix B.</p>	<p>The text has been added as requested. Please see the response to Specific Comment 25 from Barbara Renzi.</p>

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Kevin Depies

General Comment						Comment	Response
No.	Appendix	Section	Page	Paragraph	Sentence	Other	
4						Prior to distribution of the draft FSS FS DTSC provided a large package of potential ARARS, and in comments on the draft FSS FS DTSC identified additional potential ARARs to be considered for the evaluated remedies. We noted that the Draft Final FSS FS contains many of these potential ARARs but have identified some that are missing and should be included. These are presented in the attached Table 1. As part of this process we assume the Air Force is not prematurely screening out relevant ARARs. DTSC does not have the resources to identify all potential ARARs nor verify that the Air Force has included all relevant ARARs in the FSS FS and reserves the right to identify missing ARARs at a future date.	<p>National Primary Drinking Water Standards, 40 CFR Part 141.61 - The national primary drinking water standards were included as ARARs in Table A-1 of the FS. However, the citation provided was to the CERCLA requirement for applying MCLs to CERCLA sites (40 CFR 300.430). The citation has been changed to 40 CFR 141.61 in the final FS.</p> <p>California Maximum Contaminant Levels – Organic Chemicals, CCR, title 22, section 64444 – Primary Standards - This was included as an ARAR in the draft final FS in Table A-1 (page 2). It was cited as '22 CCR 64431 et seq and 64444 et seq' in the table.</p> <p>Water Quality Monitoring, CCR, title 22, section 66264.97 - Water quality monitoring requirements from Title 23 (sections 2550.7 through 2550.9) were included as ARARs in the draft final and final FS.</p> <p>Monitoring Requirements, CCR, title 27, section 20385 - This section was included as an ARAR in Table A-4 of the draft final and final FS.</p> <p>General Closure and Post-Closure Maintenance, CCR, title 27, section 20350(a), (e) - These sections were included in Table A-4 of the draft final and final FS.</p> <p>General Post-Closure Maintenance, CCR, title 27, section 21090(b)(1), (g), (e)(2) - Sections 27 CCR 21090 (a), (b), and (c) were included in Table A-4 of the draft final FS because they contain requirements for final cover, grading, and post-closure maintenance of groundwater monitoring systems. Section (e) was not included because it requires aerial surveying to track differential settlement, which is expected to be minimal due to the ages of the disposal pits and the nature of the wastes that were disposed of in them.</p>

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Kevin Depies

General Comment						Response		
No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
							Land Use Covenant, CA Civil Code Section 1471(a) & 67391.1(i) - Sections 67391.1 (a), (b), and (d) were included as ARARs in the draft final FS. Section 67391.1(i) was not included in the FS because it contains no substantive requirements (it contains definitions only).	Land Use Covenant, CA Civil Code Section 1471(a) & 67391.1(i) - Section 1471(a) was included as an ARAR in the draft final FS. Section 1471(b) was not included as an ARAR because it describes an effect of section 1471(a) (i.e., that the covenant will run with the land), not a substantive requirement.

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Kevin Depies

Specific Comment	No.	Appendix	Section	Page	Paragraph	Sentence	Other	Comment	Response
1								Response to DTSC General Comment 1	A statement regarding the uncertainty associated with the data and its implications for the Conceptual Site Model (CSM) has been added to the introduction of Section 1.5.
2								Response to DTSC General Comment 12	"Due to the age of the disposal pits, and the types of wastes placed within the pits, significant additional settlement is not anticipated. However, during the remedial design, the magnitude of potential long-term settlement will be estimated, and the impacts any settlement may have on the function and integrity of constructed elements will be evaluated. The ability of the soil and geomembrane layers of the proposed final cover system to accommodate the anticipated settlements will be assessed, as will drainage control facilities. Settlement assessments will include consideration of anticipated future reuse of the sites and the applied loads associated with these uses that could cause additional settlement. Further, infrastructure associated with reuse such as structures, utilities, and roads will be evaluated for their ability to accommodate the anticipated settlement."

Response to Comments: Draft Final Focused Strategic Sites Feasibility Study

Comment By: DTSC-Kevin Depies

Specific Comment						Comment	Response
No.	Appendix	Section	Page	Paragraph	Sentence	Other	
3				Response to DTSC Specific Comment 44	We were referring to the unsampled low areas within the Small Arms Firing Range. Runoff from the berm or other contaminated locations may have settled in these low areas. This uncertainty should be discussed and perhaps Remedial Design sampling of this area be done.		<p>The SAFR has been sufficiently characterized to support remedy selection and remedial design. Several samples, including samples from SAFRSSB06, SAFRSSB021, and SAFRSSB05, were collected south of the berm in areas where contaminants could potentially have been transported by runoff from the berm. Contaminants were not detected above screening levels in any of these locations. Most of the surface water runoff from the berm collects in the storm water catchment basin in front of the the backstop.</p>
4			2.3				<p>As stated in Appendix C, Section 11.7, the industrial use target volume was calculated using a depth of 3 feet over the entire backstop, including the top and sides, and extending laterally 50 feet in all directions from the backstop. The unrestricted use target volume was calculated using the same depth (3 feet) but extends approximately 75 feet laterally from the base of the backstop. Any contamination transported via runoff from the berm will be captured within these target volumes. Additionally, confirmation sampling will be completed as part of the remedy to ensure that soil remaining at the SAFR is cleaned up to the selected PCGs.</p> <p>Text has been added to Section 1.6 that discusses how risk assessments are handled for this FS and the uncertainties associated with the risk estimates.</p> <p>Section 2.3 needs a subsection providing a short summary of how risk assessments are being handled for the sites in the FSS FS. The summary can reference the risk assessment information provided in Appendix B. It should also reference back to the uncertainty discussions added in response to our prior General Comment 1 on the draft FSS FS. Additionally, the added text should note how for disposal pits, risk from shallow soil gas cannot be estimated via the methods employed for the non-disposal pit sites.</p>